Quality Assurance Performance Evaluations of Field Data Measurements and Field Sample Collection Methods

Quality Assurance Review Content

A SWAMP program quality assurance (QA) performance evaluation site visit should ideally be conducted each fiscal year (as budget allows) for any SWAMP agency or organization that conduct field data measurements and/or sample collection activities. The purpose of the QA site visit and review is to ensure that field personnel are using acceptable monitoring procedures and that these are consistent with those used throughout the SWAMP Program, to the extent possible. The QA site visit is conducted by personnel from the SWAMP QA Program , and has as a goal to include specific training in field data measurement and field sample collection QA/QC procedures.

Records Review

A QA site visit includes a review of the following records:

Field Data Logbooks	SWAMP Field Data Logbooks are kept on file in the respective SWAMP entity conducting field activities. A SWAMP Field Data Logbook is taken on all monitoring trips and serves as a permanent record of observations and field measurements made during every sampling event.
Calibration Records	SWAMP Multiprobe Calibration Logbooks are kept on file. A separate SWAMP Multiprobe Calibration Logbook is kept for each mulitprobe instrument. The logbook contains pre- and post-calibration data as well as maintenance and trouble shooting notes.
Flow/Velocity Data Forms	Flow/velocity data from each field measurement are kept on file. This information is recorded and maintained as part of the Field Data Logbook.
Biological Samples	Biological sample analysis records for each type of biological sample are kept. Since only final values, expressed in standard units of measurement, are reported to SWAMP, the raw data used to produce these values serve as evidence of the collection method and calculation of reported values.
QA Sample Results	Copies of the Field Blank and Duplicate sample results are kept on file. QA sample results are submitted to the Data Management and Quality Assurance Programs.

Instrument Calibration Procedure

SWAMP personnel from each entity conducting field data measurements demonstrate the proper pre- and post-calibration procedure for the primary instrument(s) used for measuring dissolved oxygen, pH, temperature and specific conductance. Where two or more personnel share SWAMP responsibilities, they may each be required to demonstrate proper calibration procedures.

It is a goal of the SWAMP QA Program to have periodic performance evaluation (PE) samples for pH and specific conductance measurements sent to SWAMP entities conducting field data measurements to test the QA of these measurements. These samples are standards of known pH and conductivity, but would be submitted on a blind basis to SWAMP field personnel. Results of these PE's are reported back to field personnel and others as appropriate.

Instrument calibration, maintenance and repair activities that are performed by SWAMP field personnel are to be recorded in a SWAMP Instrument Calibration Logbook. If calibration or maintenance is done in the field, this information may be included in the Field Data Logbook in addition to the Instrument Calibration Logbook. Serious malfunctions are noted in the Instrument Calibration Logbook on return from the field.

Data and Sample Collection Procedures

A minimum of one person from each SWAMP sample collection entity demonstrates the proper procedures for field data measurements and field sample collection at one or more SWAMP stations. Collection procedures include, but are not limited to, the following:

- < Field measurements of dissolved oxygen, pH, specific conductance, temperature, and flow (or velocity)
- < Collection, preservation, and shipping of routine water quality, metals, and organic samples
- < Collection and preparation of fecal coliform samples, as appropriate
- < Collection of sediment samples
- < Calculation of flow from raw flow measurement data, or velocity measurements
- < Biological sample collection, sample analysis, and data management

Quality Assurance Review Follow-up

Each QA review is followed by a verbal and written review of the QA visit findings. SWAMP QA Program personnel conduct the verbal review at the conclusion of the QA review, prior to leaving the office in which the review was conducted. If possible, the review is conducted in the presence of the person's immediate supervisor.

The following topics are discussed during the verbal review:

- < Materials and procedures checked during the QA review
- < Suggested and/or necessary changes in sampling procedures, and necessary action to correct any deficiencies

Corrective actions discussed during the verbal review are effective immediately following the verbal review. Corrective actions are also addressed in an interoffice memorandum.

A written memorandum is directed from the SWAMP QA Program member that conducted the QA site visit to the appropriate SWAMP Laboratory and/or Field Crew Supervisor. Copies are also sent to the SWAMP Program Manager, or designee, and the SWAMP field personnel evaluated. The memo provides the following information:

- < Description of sampling materials and procedures checked during the QA review
- < Required action to correct water quality data collection deficiencies
- < Proposed action(s) based on changes in sampling programs

A written response to all deficiencies should be made within 30 days from the date of the follow-up memo. In the response, the Laboratory and/or Field Crew Supervisor should describe any and all corrective actions that will mitigate the deficiency in the future.

The next QA visit (the following fiscal year ideally, or as budget allows) includes a review to ensure that required corrective actions were initiated and continued. If corrective actions were not taken, appropriate steps will be taken by the SWAMP QA Program and SWAMP Program management to ensure the quality of SWAMP data. The SWAMP QA Program and/or Data Program may stop accepting SWAMP data from that office, effective the date of the QA visit, until corrective actions are completed. If it is determined that data quality has been compromised, a thorough review will be conducted and questionable data will be removed from the database.

Annual Surface Water Quality Monitoring Workshop and External Scientific Planning and Review Committee Meetings

Each year, personnel from regional offices, as well as from contract laboratories and other organizations, to the extent practical and possible, will participate in multi-day workshop to review existing policies, to share previous year's monitoring and analysis information and findings, and to learn new procedures relevant to the monitoring program. Included during this timeframe is the annual SWAMP External Scientific Planning and Review Committee Meeting (SPARC), during which an informal peer review of the previous years work occurs, as well as a presentation of recommendations and findings from the SPARC scientists back to SWAMP personnel. SPARC meetings may ultimately be conducted on Regional basis. Additional training and/or other workshops may be conducted several times a year to enable field personnel to improve their skills in water quality monitoring, hydraulic measurements and biological assessment, data reporting, and analysis.

Quality Assurance of Laboratory Analysis

Laboratories analyzing SWAMP samples shall meet or exceed the requirements developed by the SWAMP QA Program. Contract laboratories used for water quality sample analysis participate in an annual SWAMP interlaboratory calibration exercise, as well as several other potential blind sample round-robin programs that demonstrate the accuracy and precision of their analysis as well as the comparability with other laboratories participating in these programs.

Quality Assurance of Sample Collection Methods

Periodic testing of field sample collection and handling skills is included in a field QA program through the use of field duplicates, field blanks, travel blanks, and equipment blank samples. Blanks are run to determine contamination from handling, preservation, and equipment. Duplicates are run to determine sampling variability.

Field Duplicate

A field duplicate is defined as a second sample, from the same location, collected in immediate succession, using identical techniques. This applies to all routine surface water collection procedures, including in-stream grab samples, bucket grab samples (e.g., from bridges), pumps, and other water

sampling devices. Duplicate samples are sealed, handled, stored, shipped, and analyzed in the same manner as the primary sample.

Best professional judgement is used to determine the acceptability of field duplicate analyses. Rejecting sample results based on wide variability of duplicate results should not be ruled out.

Field Duplicates are submitted with every twentieth sample, or a 5% frequency rate on the total number of samples planned to be collected during the year's monitoring, as outlined in RWQCB Work Plans and Task Orders. If less than 20 samples are collected during one event, submit one duplicate.

Field Blanks

Field blanks consist of deionized water that is taken to the field and poured into the sample container. They are used to assess the contamination from field sources such as airborne materials, containers, and preservatives. Metals-in-water samples (including mercury and methyl mercury), DOC in water samples, and volatile organics-in-water samples (VOC's, MTBE, BTEX) require the collection of field blanks at a 5% rate. Field blanks are not routinely required for most other SWAMP analytes, but may be inserted into the sample regime, if needed for a specific reason.

Travel Blanks

One travel blank is required for DOC in water samples, and volatile organics-in-water samples (VOC's, MTBE, BTEX) with each batch shipped. Travel blanks are samples prepared in the laboratory with pure laboratory water, preserved as required. They are transported sealed to the sampling site, handled sealed like an environmental sample, and returned to the laboratory for analysis. Travel blanks are not opened in the field. They are used to check contamination of the sample through leaching of the septum. The analysis of travel blanks should yield values less than the reporting limit.

Laboratory Equipment Blank

Laboratory equipment blanks are run by the laboratory where collection materials are cleaned and distributed. It documents that the materials provided by the laboratory are free of contamination. When each batch of tubes, filters, bottles, acid and deionized water are prepared for a sampling trip, about ten percent of the materials are chosen for QC checks. The QC checks are accomplished by analyzing metals-free water that has been pumped through the filter and tube, collected in a sample container; and preserved. The results should yield values less than the reporting limit for the individual parameter(s) to be analyzed.

Blank Water

Deionized (DI) water for blanks must be obtained from the laboratory. Ask the laboratory for DI water and specify what it is for: organics, pesticides, metals, or conventional water quality constituents. VOA travel blanks require special, purged water.